PB-248 197

IMPLEMENTATION PLAN REVIEW FOR UTAH AS REQUIRED BY THE ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT

TRW/Environmental Services

Prepared for:

Environmental Protection Agency

December 1974

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PB 248 197

EPA/450/3-74/081

DECEMBER 1974

IMPLEMENTATION PLAN REVIEW

FOR

UTAH

AS REQUIRED

BY

THE ENERGY SUPPLY

AND

ENVIRONMENTAL COORDINATION ACT

U. S. ENVIRONMENTAL PROTECTION AGENCY

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TECHNICAL REPORT DATA
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1. REPORT NO. EPA-450/3-74-081	2.
3. RECIPIENT'S ACCESSION NO.	
4. TITLE AND SUBTITLE: IMPLEMENTATION PLAN REVIEW FOR UTAH AS REQUIRED BY THE ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT	5. REPORT DATE: December 1974
	6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS: U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, N.C., Regional Office VIII, Denver, Colorado, and TRW, Inc., Redondo Beach, California	10. PROGRAM ELEMENT NO.
	11. CONTRACT/GRANT NO.: 68-02-1385
12. SPONSORING AGENCY NAME AND ADDRESS: U.S. Environmental Protection Agency, Office of Air and Waste Management, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711	13. TYPE OF REPORT AND PERIOD COVERED: Final
	14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

16. ABSTRACT

Section IV of the Energy Supply and Environmental Coordination Act of 1974, (ESECA) requires EPA to review each State Implementation Plan (SIP) to determine if revisions can be made to control regulations for stationary fuel combustion sources without interferring with the attainment and maintenance of the national ambient air quality standards. This document, which is also required by Section IV of ESECA, is EPA's report to the State indicating where regulations might be revised.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air pollution State implementation plans		

PRICES SUBJECT TO CHANGE

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report)	21. NO. OF PAGES
Release unlimited	Unclassified	55
	20. SECURITY CLASS (This page) Unclassified	22. PRICE $4.50

EPA Form 2220-1 (9-73)

EPA-450/3-74-081

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FOR
UTAH
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PREPARED BY THE FOLLOWING TASK FORCE:

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Environmental Services of TRW, Inc.
(Contract 68-02-1385)

U. S. Environmental Protection Agency
Office of Air and Waste Management
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

December 1974

TABLE OF CONTENTS

		Page
1.0	EXECUTIVE SUMMARY	1
2.0	STATE IMPLEMENTATION PLAN REVIEW	6
	2.1 Summary	6
	2.2 Air Quality Setting - State of Utah	8
	2.3 Background on the Development of the Current State Implementation Plan	10
	2.4 Special Considerations - Utah	11
3.0	CURRENT ASSESSMENTS BASED ON SIP REVIEWS	13
	3.1 Regional Air Quality Assessments	13
	3.2 Power Plant Assessments	13
	3.3 Industrial/Commercial/Institutional Source Assessment	14
	3.4 Area Source Assessments	14
	3.5 Impact of Fuel Switching	14
	TECHNICAL APPENDICES	
	APPENDIX A - State Implementation Plan Background	16
	APPENDIX B - Regional Air Quality Assessment	31
	APPENDIX C - Power Plant Assessment	34
	APPENDIX D - Industrial, Commercial, Institutional Source Assessment	43
	APPENDIX E - Area Source Assessment	46
	APPENDIX F - Other Analyses	47

1.0 EXECUTIVE SUMMARY

The enclosed report is the U. S. Environmental Protection Agency's (EPA) response to Section IV of the Energy Supply and Environmental Coordination Act of 1974 (ESECA). Section IV requires EPA to review each State Implementation Plan (SIP) to determine if revisions can be made to control regulations for stationary fuel combustion sources without interfering with the attainment and maintenance of the National Ambient Air Quality Standards (NAAQS). In addition to requiring that EPA report to the State on whether control regulations might be revised, ESECA provides that EPA must approve or disapprove any revised regulations relating to fuel burning stationary sources within three months after they are submitted to EPA by the States. The States may, as in the Clean Air Act of 1970, initiate State Implementation Plan revisions; ESECA does not, however, require States to change any existing plan.

Congress has intended that this report provide the State with information on excessively restrictive control regulations. The intent of ESECA is that SIP's, wherever possible, be revised in the interest of conserving low sulfur fuels or converting sources which burn oil or natural gas to coal. EPA's objective in carrying out the SIP reviews, therefore, has been to try to establish if emissions from combustion sources may be increased. Where an indication can be found that emissions from certain fuel burning sources can be increased and still attain and maintain NAAQS, it may be plausible that fuel resource allocations can be altered for "clean fuel savings" in a manner consistent with both environmental and national energy needs.

In many respects, the ESECA SIP reviews parallel EPA's policy on clean fuels. The Clean Fuels Policy has consisted of reviewing implementation plans with regards to saving low sulfur fuels and, where the primary sulfur dioxide air quality standards were not exceeded, to encourage States to either defer compliance regulations or to revise the SO_2 emission regulations. The States have also been asked to discourage large scale shifts from coal to oil where this could be done without jeopardizing the attainment and maintenance of the NAAQS.

To date, EPA's fuels policy has addressed only those States with the largest clean fuels saving potential. Several of these States have revised or are currently in the process of revising SO_2 regualtions. These States are generally in the Eastern half of the United States. ESECA, however, extends the analysis of potentially over-restrictive regulations to all 55 States and territories. In addition, the current reviews address the attainment and maintenance of all the National Ambient Air Quality Standards.

There are, in general, three predominant reasons for the existence of overly restrictive emission limitations within the State Implementation Plans. These are 1) The use of the example region approach in developing State-wide air quality control strategies; 2) the existence of State Air Quality Standards which are more stringent than NAAQS; and 3) the "hot spots" in only part of an Air Quality Control Region (AQCR) which have been used as the basis for controlling the entire region. Since each of these situations affect many State plans and in some instances conflict with current national energy concerns, a review of the State Implementation Plans is a logical follow-up to EPA's initial appraisal of the SIP's conducted in 1972. At that time SIP's were approved by EPA if they demonstrated the attainment of NAAQS or more stringent state air quality standards. Also, at that time an acceptable method for formulating control strategies was the use of an example region for demonstrating the attainment of the standards.

The example region concept permitted a State to identify the most polluted air quality control region (AQCR) and adopt controlregulations which would be adequate to attain the NAAQS in that region. In using an example region, it was assumed that NAAQS would be attained in the other AQCR's of the State if the control regulations were applied to similar sources. The problem with the use of an example region is that it can result in excessive controls, especially in the utilization of clean fuels, for areas of the State where sources would not otherwise contribute to NAAQS violations. For instance, a control strategy based on a particular region or source can result in a regulation requiring 1 percent sulfur oil to be burned state-wide where the use of 3 percent sulfur coal would be adequate to attain NAAQS in some locations.

EPA anticipates that a number of States will use the review findings to assist them in making the decision whether or not to revise portions of their State Implementation Plans. However, it is most important for those States which desire to submit a revised plan to recognize the review's limitations. The findings of this report are by no means conclusive and are neither intended nor adequate to be the sole basis for SIP revisions; they do, however, represent EPA's best judgment and effort in complying with the ESECA requirements. The time and resources which EPA has had to prepare the reports has not permitted the consideration of growth, economics, and control strategy tradeoffs. Also, there has been only limited dispersion modeling data available by which to address individual point source emissions. Where the modeling data for specific sources were found, however, they were used in the analysis.

The data upon which the reports' findings are based is the most currently available to the Federal Government. However, EPA believes that the States possess the best information for developing revised plans. The States have the most up-to-date air quality and emissions data, a better feel for growth, and the fullest understanding for the complex problems facing them in the attainment and maintenance of air quality standards. Therefore, those States desiring to revise a plan are encouraged to verify and, in many instances, expand the modeling and monitoring data supporting EPA's findings. In developing a suitable plan, it is suggested that States select control strategies which place emissions for fuel combustion sources into perspective with all sources of emissions such as smelters or other industrial processes. States are encouraged to consider the overall impact which the potential relaxation of overly restrictive emissions regulations for combustion sources might have on their future control programs. This may include air quality maintenance, prevention of significant deterioration, increased TSP, NO_x, and HC emissions which occur in fuel switching, and other potential air pollution problems such as sulfates .

Although the enclosed analysis has attempted to address the attainment of all the NAAQS, most of the review has focused on total suspended particulate matter (TSP) and sulfur dioxide (SO_2) emissions. This is because stationary fuel combustion sources constitute the greatest source of SO_2 emissions and are a major source of TSP emissions.

Part of each State's review was organized to provide an analysis of the SO_2 and TSP emission tolerances within each of the various AQCR's. The regional emission tolerance estimate is, in many cases, EPA's only measure of the "over-cleaning" accomplished by a SIP. The tolerance assessments have been combined in Appendix B with other regional air quality "indicators" in an attempt to provide an evaluation of a region's candidacy for changing emission limitation regulations. In conjunction with the regional analysis, a summary of the State's fuel combustion sources (power plants, industrial sources, and area sources) has been carried out in Appendix C, D, and E.

FINDINGS

- The Utah State Implementation Plan has been reviewed for the most frequent causes of over restrictive emissions regulations. Although Utah used the example region approach in developing control strategies for both TSP and SO_2, there is no indication that emission regulations for existing sources are over restrictive in the context of Section IV of ESECA.

- Utah has a wide spread particulate problem as indicated by reported violations of NAAQS at every monitoring location. Windblown fugitive dust is a large contributor, however, major "hot spots" are man-induced. Emission regulations for existing sources are aimed at eliminating localized pollutant problems. Relaxation of these regulations would make attainment and maintenance of NAAQS unlikely in the present "hot spots", and would be mute in most other areas of the state due to the lack of man-made emission sources.

- At present Utah has only one significant SO_2 problem, and it is caused by process source emissions. Once this source completes compliance efforts, SO_2 air quality will probably meet NAAQS everywhere in the state. The only SO_2 emission regulation for existing fuel combustion sources is a sulfur limit on fuel. (Coal - 1%, Oil - 1.5%). The findings of this analysis indicate that relaxation of this regulation is unnecessary because virtually all local coals have lower sulfur contents. Utah presently uses coal for a large percentage of stationary fuel combustion. Using the local coals, additional coal utilization can be affected within the framework of existing regualtions.

- Major new coal fired power plants have significant potential for air pollution impacts in the clean, less inhabited areas of Utah. New Source Performance Standards may not be sufficient to preclude localized violation of NAAQS.

- It should be noted that every AQCR has proposed Air Quality Maintenance areas for both SO_2 and TSP in those locations where significant emission sources are or will be located.

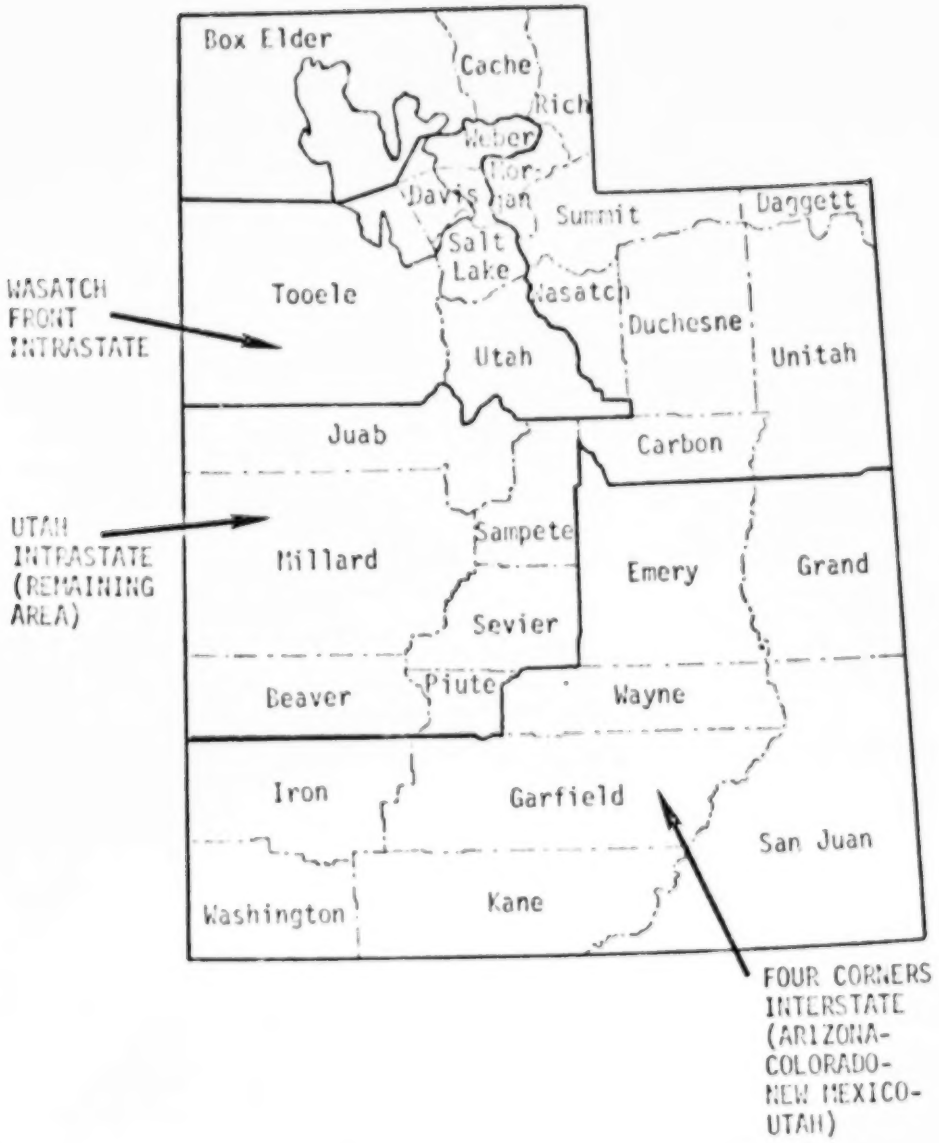

Figure 1. State of Utah

2.0 STATE IMPLEMENTATION PLAN REVIEW

2.1 SUMMARY

A revision of fuel combustion source emissions regulations will depend on many factors. For example:

- Does the State have air quality standards which are more stringent than NAAQS?
- Does the State have emission limitation regulations for control of (1) power plants, (2) industrial sources, (3) area sources?
- Did the State use an example region approach for demonstrating the attainment of NAAQS or more stringent State standards?
- Has the State not initiated action to modify combustion source emission regulations for fuel savings; i.e., under the Clean Fuels Policy?
- Are there no proposed Air Quality Maintenance Areas?
- Are there indications of a sufficient number of monitoring sites within a region?
- Is there an expected 1975 attainment date for NAAQS?
- Based on (1973) air quality data, are there no reported violations of NAAQS?
- Based on (1973) air quality data, are there indications of a tolerance for increasing emissions?
- Are the total emissions from stationary fuel combustion sources proportionally higher than those of other sources?
- Is there a significant clean fuels savings potential in the region?
- Do modeling results for specific fuel combustion sources show a potential for a regulation revision?

The following portion of this report is directed at answering these questions. An AQCR's potential for revising regulations increases when there are affirmative responses to the above.

STATE IMPLEMENTATION PLAN REVIEW

SUMMARY

INDICATORS	UTAH TSP	UTAH SO_2	FOUR CORNERS INTERSTATE AQCR TSP	FOUR CORNERS INTERSTATE AQCR SO_2	UTAH INTRASTATE AQCR TSP	UTAH INTRASTATE AQCR SO_2	WASATCH FRONT INTRASTATE AQCR TSP	WASATCH FRONT INTRASTATE AQCR SO_2
• Does the State have air quality standards which are more stringent than NAAQS?	NO	NO						
• Does the State have emission limiting regulations for control of:								
a. Power plants	Yes	Yes[a]						
b. Industrial sources	Yes	Yes[a]						
c. Area sources	Yes	Yes						
• Is the State currently engaged in attempting to demonstrate the attainment of NAAQS or more stringent State standards?	Yes	Yes						
• Has the State not initiated action to modify some fuel combustion regulations for fuel scarcity, i.e., under the Clean Fuels Policy?	Yes	Yes						
• Are there no proposed Air Quality Maintenance Areas?			NO	NO	NO	NO	NO	NO
• Are there indications of a sufficient number of monitoring sites within a region?			Yes	NO	NO	NO	Yes	Yes
• Is there an expected non-attainment into for NAAQS?			Yes	NO	Yes	Yes	NO	NO
• Based on reported (SAR) air quality data, does air quality meet NAAQS?			NO	N/A	N/A	N/A	NO	NO[c]
• Based on reported (SAR) air quality data, are there indications of a tolerance for increasing emissions?			NO	N/A	NO	N/A	NO	NO[c]
• Are the total emissions from stationary fuel combustion sources lower than those of other sources?			NO	NO	NO	NO	NO	Yes
• Do modeling results for specific fuel combustion sources show a potential for a regulation revision?			N/A	N/A	N/A	N/A	N/A	N/A
• Must existing regulations be revised to accomplish significant fuel switching?			NO	NO	NO	NO	NO	NO
• Based on the above indicators, what is the potential for revising fuel combustion source emission limiting regulations?			Poor	Poor	Poor	Poor	Poor	Poor
• Is there a significant Clean Fuels Saving factor in the region?			NO	NO	NO	NO	NO	NO

a/ Sulfur limit on fuels for existing sources. 80% control for new sources.

b/ None in Utah, 3 in the region

c/ Current violations are single source oriented - a copper smelter in Magna Utah which will be brought into compliance with EPA emission regulations.

The initial part of the SIP review report, Section 2 and Appendix A, was organized to provide the background and current situation information for the State Implementation Plan. Section 3 and the remaining Appendices provide an AQCR analysis which helps establish the overall potential for revising regulations. Emission tolerance estimates have been combined in Appendix B with other regional air quality "indicators" in an attempt to provide an evaluation of a region's candidacy for revising emission limiting regulations. In conjunction with the regional analysis, a characterization of the State's fuel combustion sources (power plants, industrial sources, and area sources) has been carried out in Appendix C, D, and E.

Based on an overall evaluation of EPA's current information, AQCR's have been classified as good, marginal, or poor candidates for regulation revisions. The following table summarizes the State Implementation Plan Review. The remaining portion of the report support this summary with explanations.

2.2 AIR QUALITY SETTING - STATE OF UTAH

2.2.1 Air Quality Control Regions

The State of Utah is divided into three AQCR's. These are: Four Corners Interstate AQCR (14), Utah Intrastate AQCR (219), and Wasatch Front Intrastate AQCR (220), (Figure A-1[1]).

2.2.2 Ambient Air Quality Standards

A summary of the federal and Utah air quality standards for the pollutants under study is presented in Table A-3. It should be noted that Utah duplicates the federal standards for both SO_2 and NO_2. The only difference is the Utah standard for particulate. The TSP standard is less stringent than the federal standard for annual averages; however, it is stricter for a single 24-hour measurement. Since federal standards apply nationwide, the state standard is mute in this case.

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[1]All tables and figures are in Appendices A through F.

2.2.3 Air Quality Status

Air quality monitoring in Utah is limited. The Utah air monitoring network (Table A-4) does not provide measurements in the Utah Interstate AQCR.[1] Two monitors for suspended particulates are located in the Four Corners AQCR. The remaining stations are located in the Wasatch Front AQCR. The network provides measured pollutant levels for suspended particulates at all 8 sites, SO_2 data at 5 of the sites, and NO_2 data at 4 of the sites.

A summary of Utah Air Quality Status is presented in Tables A-5 and A-6. The number of stations exceeding standards are presented by AQCR. The highest SO_2 readings in Utah are around the Kennecott Copper Smelter near Magna. When this significant source is brought into compliance, all SO_2 measurements in the State should be below the SO_2 ambient standards. The next highest SO_2 readings are in Salt Lake City; however, the concentrations are within the standards. The highest particulate readings in the State are in Salt Lake City and Provo. At 325 ug/m^3 (24-hour average), they are not far from standards and should be within limits by 7/75.

2.2.4 Emissions Summary

A summary of SO_2 emissions is presented in Table A-9. The summary is presented in AQCR totals. Table A-8 presents the particulate summary by AQCR. The summaries were prepared from the most current data available.[2] An examination of the two summaries show that most sources are in the Wasatch Front AQCR. The bulk of the Four Corners AQCR emissions are not generated in Utah. The most telling information is a comparison of the total tons/year of pollutant by AQCR, compared to the percent contribution from fuel combustion.

In general, air pollution problems within Utah tend to be localized and single source oriented. Due to the State's arid climate, natural fugitive dust emissions may make compliance with particulate secondary standards difficult even when sources causing localized pollutant problems meet their present compliance dates.

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[1] NADB information

[2] 1974 NEDS: August 5, 1974.

2.3 BACKGROUND ON THE DEVELOPMENT OF THE CURRENT STATE IMPLEMENTATION PLAN

The SIP control strategies and regulations were based on the example region approach. Wasatch Front AQCR (220), was used as the example region. The control strategies and regulations, as submitted by the State, were inadequate to attain the national standards for particulates and SO_2 in the Wasatch Front AQCR. The other two regions were below national standards for these pollutants.

The State regulations for the control of particulate matter included a requirement that sources control 85% of potential particulate emissions. The TSP regulation was disapproved by EPA for the Wasatch Front AQCR because it was ambiguous and unenforceable.

EPA promulgated particulate matter regulations for the Wasatch Front AQCR applicable to process sources, incinerators, fuel combustion sources and by-product coke ovens on May 14, 1973 (38 FR 12709).

The Kennecott Copper Corporation and United States Steel each filed a petition for reconsideration of these regulations on May 14, 1973. Based on clarifications and new evidence provided by the corporations, EPA has modified this regulation as it affects open-hearth furnaces, sintering plants, copper smelting operations, and by-product coke ovens (9/5/74).

There are no SO_2 regulations applicable to existing sources, other than a limit on sulfur content of fuels (1% for coal; 1-1/2% for oil). The State has a current regulation requiring 80% control of SO_2 emissions from new sources, with potential emissions of 500 tons of SO_2 per year or greater. A new regulation controlling SO_2 emissions from copper smelters, the major SO_2 emission source in the State, was proposed by EPA on October 18, 1974 (39 FR 37212). A summary of Utah's current fuel combustion regulations is presented in Table A-12.

The Utah control strategy relies upon reasonably available control technology for both SO_2 and particulate control, and upon the enforcement of three Utah directives pertaining to Notice of Construction, Open Burning, and Visible Emissions. The control strategy for particulate also

includes a Utah directive pertaining to particulate emissions. The SO_2 control strategy contains two Utah directives pertaining to Sulfur Content of Fuels and Sulfur Oxide Emissions. It also relies on the Federal New Source Performance Standards (Federal Register, 40 CFR, Part 60).

Utah does not have regulations controlling NO_2.

2.4 SPECIAL CONSIDERATIONS - UTAH

Ten counties within the State have been proposed as air quality maintenance areas (Appendix A). It is anticipated that special requirements for these areas will be developed by the State and submitted to EPA as modifications to the implementation plan. Virtually all major present and planned fuel combustion sources are located in the counties proposed as AQMA's.

Utah plans to consider the adoption of SO_2 emissions regulations for the copper smelters in October. In addition, Utah may drop the present 80% SO_2 emissions standard and adopt a non-degradation policy as a regulation. This policy requires new sources in clean air areas to be controlled by best available technology.

Like much of the Western United States, Utah has an abundance of energy resources. These resources now have the potential of being developed. As a source of future supply, coal and oil shale are the most promising resources for development.

It is estimated that the Unitah Basin of Eastern Utah contains a potential reserve of 90 billion barrels of oil, in the form of oil shale. For years this resource has been bypassed in favor of more easily extracted fossil fuels. Two parcels (approximately 5000 acres each) were leased by the Federal Government to encourage oil shale development. Successful operations on the leased tracts should produce 50,000 BPD (barrels per day) of crude oil from each lease by 1980. If the oil (kerogen) extraction process proves to be economically viable, the Federal Energy Administration (FEA) has projected a joint Utah-Colorado 1990 minimum development potential of 750,000 BPD production (estimated split: Utah, 150,000 - 200,000 BPD; Colorado, 550,000 - 600,000 BPD).

The most likely near term energy resource development in Utah is coal. Utah has three major deposits of bituminous coal with low sulfur content. The largest is again in the Unitah Basin, in the eastern mid-third of the state. Two smaller deposits are in the southern half of Utah.

In 1971, Utah had 22 coal mines, 21 underground and 1 above ground (strip mine). Those mines produced $34.1 million in revenue. With the resurgence of coal as the source of domestic power needs, it is expected that extensive coal mine development will occur.

3.0 CURRENT ASSESSMENTS BASED ON SIP REVIEWS

3.1 REGIONAL AIR QUALITY ASSESSMENTS

The only sites in the State that indicate a significant problem area are the SO_2 monitors in the vicinity of the Kennecott Copper smelter near Magna, Utah. This source is the major emitter of SO_2 in the State. Once this source completes compliance efforts, SO_2 standards will be met throughout the State.

Tables A-10 and A-11 present the tolerance for emission increases on a regionwide basis. A drawback for using this approach lies in the lack of comprehensive air quality data and in the large geographical dispersion of emission sources in most Utah counties. The analysis does, however, give some indication of potential candidate areas for relaxation.

Tables B-1 and B-2 summarize the general data for each pollutant and AQCR that must be considered when estimating the potential for regulation relaxation. The analysis was performed to determine if there were any obvious combustion source candidates. There is no indication from available data that overly stringent regulations exist in any region. Areas that essentially meet air quality standards now do not have stringent existing source regulations (they also do not have many sources).

3.2 POWER PLANT ASSESSMENTS

At the present time there are fewer than 25 major sites with combustion sources in the State. Four Corners AQCR (14) and Utah AQCR (219) have one power plant each. Wasatch Front AQCR (220) contains the remaining sources.

The power plants in Four Corners AQCR (14) and Utah AQCR (219) are 100% coal fired. There are seven power plants in Wasatch Front AQCR (220). Of these, one is presently 100% coal fired, two are gas and oil fired with no possibility of conversion (diesel and gas turbine), one plant and one unit of another are gas and oil fired with no coal capability, the remainder (3 plants, 4 units) presently use coal part of the time. Table C-1 presents relevant data for all power plants presently in operation in Utah. All plants presently comply with emission regulations.

Table C-2 lists all known projected power plants (1974-1985). These are all large mine mouth coal-fired installations. Most of these power plants

are to be located adjacent to the coal source. The first unit of Huntington has recently gone into operation.

Table C-3 provides an estimate of air quality impacts from the proposed plants. This estimate is based on EPA modeling studies and considers NSPS emission limits only. As can be seen, there are potential violations of the SO_2 ambient standards around several of the plants. More stringent regulations may be required to maintain NAAQS.

Table C-4 lists the present fuel sources for each of the power plants. The power plants that utilize both coal and other fuels are candidates for fuel switching. These plants are further evaluated in Appendix F.

3.3 INDUSTRIAL/COMMERCIAL/INSTITUTIONAL SOURCE ASSESSMENT

All major stationary fuel combustion sources other than power plants were reviewed to identify candidates for fuel switching. There are no major fuel combustion sources in the Four Corners and Utah AQCR's that do not presently use coal, or that have an apparent capability to switch to coal. Table D-1 lists the major sources in the Wasatch Front AQCR (220) that presently use coal for at least part of the time and are candidates for 100% conversion. These plants are further analyzed in Appendix F.

3.4 AREA SOURCE ASSESSMENTS

The State of Utah was found to have no area sources which could be evaluated within the context of Section 4 of ESECA.

3.5 IMPACT OF FUEL SWITCHING

An analysis of the fuel combustion sources was made to determine the feasibility of conversion to coal and its resulting impacts on emissions and regulations. The candidate sources for fuel switching identified in Appendices C and D were evaluated to determine the potential for relaxation of regulations. The percentage of coal utilized was estimated by translating all fuel usage into total annual heat input and directly proportioning on the basis of the percent of annual heat input contributed by each fuel type. The emissions resulting from conversion to coal at these candidate combustion sources were estimated and compared to current emissions (Appendix F).

Table F-1 presents the power plant present and potential emission based on 100% coal utilization with present control equipment. All power plants will meet current emission regulations as configured.

Table F-2 presents the candidate industrial source present and potential emissions based on maximum coal utilization with present control equipment. The sources would not meet present particulate regulations.

Table F-3 presents a summary of emissions impact from fuel switching. Because the particulate emissions from industrial sources were so far out of line, emissions resulting from the addition of adequate control equipment were also calculated and included.

The analysis indicated that for SO_2 (after the Kennecott smelter completes compliance efforts), the increase in projected emissions due to fuel conversions would be significant. Ambient air quality standards would be in jeopardy if further relaxation of regulations were to take place. For particulates, the analysis indicates that fuel switching will further aggravate the particulate compliance problem in the Wasatch Front AQCR. The TSP standard would probably be met by sources complying with present regulations; however, relaxation of the regulations in this region would probably put the compliance goals out of reach.

APPENDIX A

- State implementation plan information
- Current air quality information
- Current emissions information

Tables in this appendix summarize original and modified state implementation plan information, including original priority classifications, attainment dates, ambient air quality standards, and fuel combustion emission regulations. SAROAD data for SO_2 and TSP monitoring stations are shown for AQCR's in the state. NEDS emissions data by AQCR[1] are tabulated and broken down into fuel burning categories.

Tables A-10 and A-11 show a comparison of emission inventories in the original SIP and those from the NEDS. An emission tolerance, or emission tonnage which might be allowed in the AQCR and still not violate national secondary ambient air quality standards, is shown for SO_2 and particulates. The intent of this calculation is to indicate possible candidate regions for fuel switching. Tolerance was based on either the degree of control expected by the SIP or upon air quality/emission relationships which are calculated from more recent data. The value of the emission tolerance provides an indication of the degree of potential an AQCR possesses for fuel revisions and regulation relaxation.

Methodology for Increased Emissions Tolerance

A tolerance for increased emissions was determined as follows. First, an "allowable emissions" was calculated for each AQCR based on the current NEDS data and the percent reduction (or increase) required to meet the national secondary ambient air quality standards in that AQCR (worst case from Tables A-5 and A-6). This "allowable" was then compared to that from the SIP. If reasonable agreement occurred, then the "estimated emissions" which would result after implementation of the SIP in that AQCR were used to calculate an emissions tolerance. Thus, some credit could be given to an AQCR which might be restricting emissions more than required by ambient air quality standards. For instance, emission controls applied to AQCR's

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[1] "1972 National Emissions Report," EPA - 450/2-74-012, June 1974.

other than the example region for the state may reduce emissions well below "allowables." In the event that no data existed or was available from the SIP for an AQCR, the current air quality was used to assign emissions tolerance based on proportional rollback or rollup. Current air quality was also the criteria, if emissions data from SIP and NEDS did not appear to be comparable (this is often the case).

When no SIP emissions data was available, and current air quality levels were less than one half of the level represented by an ambient air quality standard, no "rollup" emissions tolerance was calculated in Tables A-10 and A-11. This arbitrary cutoff point was chosen so as not to distort the emissions tolerance for an area. At low levels of a pollutant, the relationship between emissions and air quality is probably not linear. Although this cutoff may leave some AQCRs with no quantifiable emissions tolerance, it was felt that no number at all would be preferable to a bad or misleading number.

It is emphasized that emissions tolerance is a region-wide calculation. This tolerance obviously makes more sense in, say, an urban AQCR with many closely spaced emissions sources than in a largely rural AQCR with geographically dispursed emissions.

Table A-1. AQCR Priority Classification and AQMAs - Utah

AQCR	Fed. [illegible]	Part.[a]	SO_x[b]	NO_x[c]	Demographic Information			Proposed AQMA Designations[d]		
					Population 1970	Square Miles	Population Density	TSP Counties	SO_x Counties	NO_x Counties
Four Corner (Ariz., Colo., N. Mex., Utah)	14	1-A	1-A	III	368,310	109,101	3.4			
Utah Portic					54,338	33,103	1.6	(5)Emery, Garfield Kane, Wash. Wayne	(5)Emery, Garfield Kane, Wash. Wayne	
Utah Intrastate (Remaining)	219	III	III	III	161,701	38,402	4.2	(3)Carbon, Duchesne, Uintah	(3)Carbon, Duchesne, Uintah	
Wasatch Front	220	I	I	I	385,085	10,422	37.0	(3)Salt Lake, Utah, Davis	(2)Salt Lake, Davis	(3)Salt Lake, Utah, Davis

Criteria Based on Maximum Measured (or Estimated) Pollution Concentration in Area

Pollutant	I	II	III
	Greater than	From - To	Less than
[a]Sulfur oxide:			
Annual arithmetic mean ..	100	60-100	60
24-hour maximum	455	260-455	260
[b]Particulate matter:			
Annual geometric mean ...	95	60- 95	60
24-hour maximum	325	150-325	150
[c]Nitrogen dioxide	110		100

[d]Federal Register, August, 1974 SMSA's showing potential for NAAQS violations due to growth

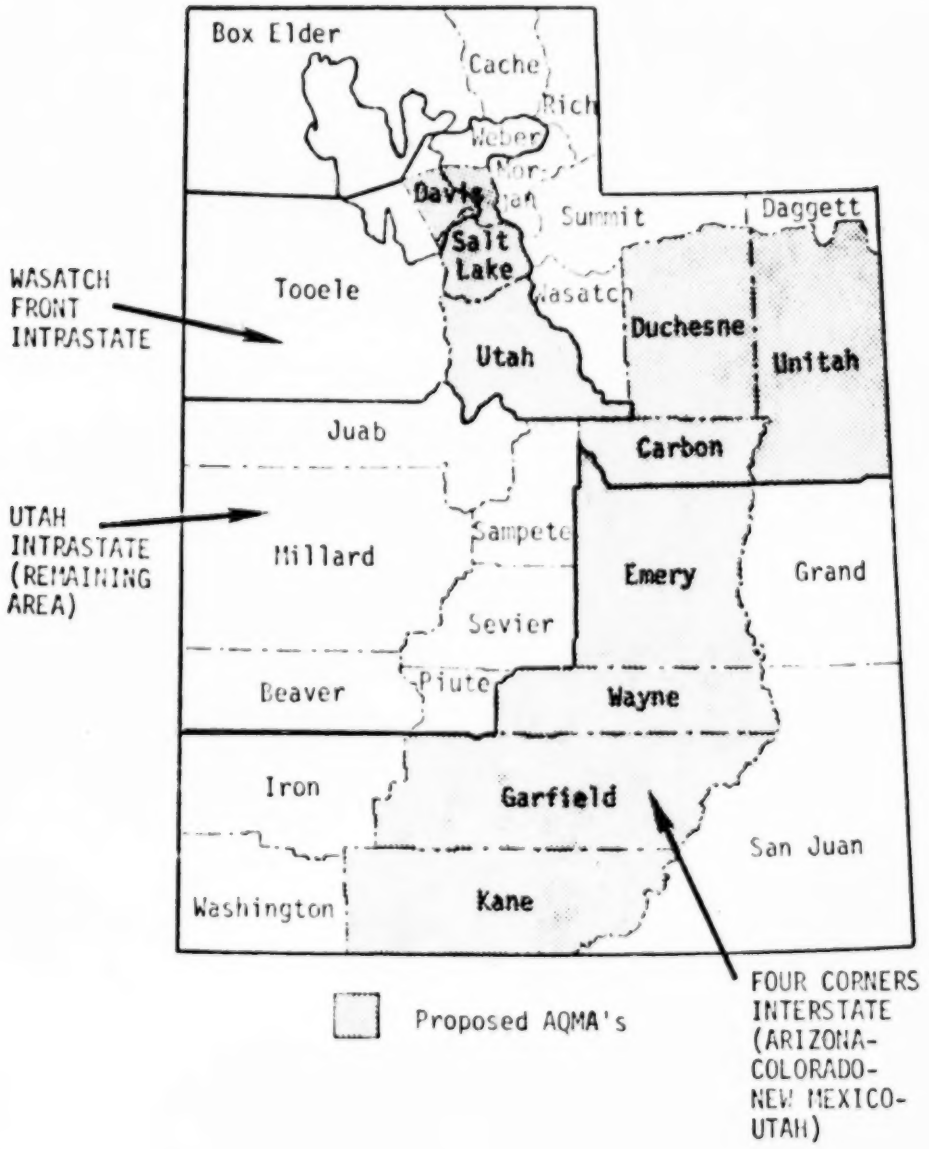

Figure A-1
Utah AQCR's

Table A-2. Utah Attainment Dates

AQCR #	AQCR Name	Particulates Attainment Dates		Sulfur Dioxide Attainment Dates		Nitrogen Oxides Attainment Dates
		Primary	Secondary	Primary	Secondary	
14	Four Corners Interstate (Ariz., Colo., N.M., Utah)	7/75	7/75	3/76	3/76	a
219	Utah Interstate	a	a	a	a	a.
220	Wasatch Front	7/77	7/77	7/77	b	7/75

[a]Air quality levels presently below standards.

[b]18 months extension granted.

Table A-3. Utah Ambient Air Quality Standards

All Concentrations in $\mu gms/m^3$

		Total Suspended Particulate		Sulfur Oxides			Nitrogen Dioxide
		Annual	24-Hour	Annual	24-Hour	3 Hour	
Federal[1] (Nov. 1972)	Primary	75 (G)	260[a]	80 (A)	365[a]	--	100 (A)
	Secondary	60 (G)	150[a]	--	--	1300[a]	100 (A)
State (Nov. 1969)		90 (A)	200[(b)]	80 (A)	365[a]	--	100 (A)
				--	--	1300[a]	100 (A)

(1) Federal Regulations Apply

(A) Arithmetic Mean

(G) Geometric Mean

(a) Not to be exceeded more than once per year

(b) Not more than 1% of time between April 1 and October 31
Not more than 5% of time between Nov. 1 and March 31

Table A-4. Utah Air Sampling Sites

AQCR	SITE	COUNTY
Four Corners (14)	Bullfrog Basin	Kane
	Wahweap Marina	Kane
Wasatch Front (220)	Kearns	Salt Lake
	Magna	Salt Lake
	Salt Lake City	Salt Lake
	Salt Lake City 1A	Salt Lake
	Ogden	Weber
	Provo	Utah
Utah (219)	-None-	

Table A-5. AQCR Air Quality Status (1973), TSP [a]

AQCR Name	AQCR #	# Stations Reporting	TSP Concentration (mg/m^3) Highest Reading Annual	TSP Concentration (mg/m^3) Highest Reading 24-Hr.	TSP Concentration (mg/m^3) 2nd Highest Reading 24-Hr	# Stations Exceeding Ambient Air Quality Standards Primary Annual	Primary 24-Hr.	Secondary Annual	Secondary %	Secondary 24-Hr.[d]	Secondary %	* Reduction Required to Meet Annual Secondary Standard	* Reduction Required to Meet 2nd 24-Hr. Standard
Four Corners (Ariz, Colo, N. Mex. Utah)	14 [b]	23 [c]	65	430	374	0	1	1	4	8	35	60	24-hour Secondary Standard
Utah Portion		2	--	254	186	-	1	-	-	2	100	19	"
Utah	219	0	--	---	---	0	-	-	-	-	-	--	
Wasatch Front	220	6	89	390	330	4	2	4	80	6	100	54	"

a. 1973 air quality in National Air Data Bank as of July 28, 1974
b. Interstate
c. Violations based on more than one reading in excess of standards
d. Formula: $\frac{\text{2nd highest 24-hr --- Secondary 24-hr standard}}{\text{2nd highest 24-hr}}$

Table A-6. Utah AQCR Air Quality Status (1973), SO_2[a]

AQCR Name	AQCR #	# Stations Reporting 24-Hr (Bubbler)	# Stations Reporting (Contin.)	SO_2 Concentration ($\mu g/m^3$) Highest Reading Annual	Highest Reading 24-Hr	2nd Highest Reading 24-Hr	# Stations Exceeding Ambient Air Quality Stds. Primary Annual	Primary 24-Hr[c]	Secondary 3-Hr	% Reduction[d] Required To Meet Standards	Standard on Which % Reduction Is Based
Four Corners (Ariz, Colo. N. Mex, Utah) Utah Portion	14[b]	9	4	2	79	28	0	1	0	Presently Meets Standards	
Utah	219	0	0	-	-	-	-	-	-		
Wasatch Front	220	4	8	128[e] 24[f]	- -	3072[e] 121[f]	1	8	4	88 Presently Meets Standards	24-hr Primary Standard

a. 1973 air quality in National Air Data Bank as of July 28, 1974

b. Interstate

c. Violations based on more than one reading in excess of standards

d. Formula: $\frac{\text{2nd highest 24-hr --- Primary 24-hr standard}}{\text{2nd highest 24-hr}} \times 100$

e. From station located at Bonneville

f. From station in Salt Lake City (typical)

Table A-7. Fuel Combustion Source Summary - Utah[a]

AQCR Name	AQCR #	Utah Power Plants		Other Fuel Combustion Point Sources	
		NEDS[b]	FPC[c]	Particulate	SO_2
Four Corners (Utah)	14	1	1	2	0
Utah	219	1	0	2	2
Wasatch Front	220	5	3	6	4

a. Only sources in Utah are included

b. All sources from National Data Bank Point Source listing as of June 17, 1974

c. Federal Power Commission information for 1973 of major power plants

Table A-8. Utah Emissions Summary, TSP[a]

AQCR		Total Tons/Year	Percent Fuel Combustion	Electricity Generation Tons/Year	%	Point Source Fuel Combustion Tons/Year	%	Area Source Fuel Combustion Tons/Year	%
14[b]	Four Corners	37,674	79.15	27,334	72.6	95	0.25	2395	6.3
	Utah Portion	1,768	44.1	73	4.1	0	--	714	40.0
219	Utah	19,164	48	5,200	27.1	74	0.4	3922	20.5
220	Wasatch Front	57,891	43.6	588	1.0	7317	12.6	17370	30.0

(a) Emissions in Data Bank as of June, 1974

(b) Interstate

Table A-9. Utah Emissions Summary, SO_2[a]

AQCR		Total Tons/Year	Percent Fuel Combustion	Electricity Generation Tons/Year	%	Point Source Fuel Combustion Tons/Year	%	Area Source Fuel Combustion Tons/Year	%
14[b]	Four Corners	119,755	93.8	110,854	92.6%	175	0.146%	1315	1.1%
	Utah Portion	1,717	49.6	98	5.7%	0	--	754	43.9%
219	Utah	11,637	62.3	3,675	31.6%	659	5.7%	2909	25%
220	Wasatch Front	154,455	16.1	7,630	4.9	8510	5.5%	8859	5.7%

(a) Emissions in Data Bank as of June 1974

(b) Interstate

Table A-10. Utah Required Emission Reductions

SIP					1973 Data			
AQCR	AQ Measurement Control Value	Emissions (10^3 tons)	Allowable Emissions[b] (10^3 tons)	1975[b] Estimated Emissions After Controls (10^3 tons)	Percent Reduction Required Based On 1973 AQ Data	NEDS Emissions (10^3 tons)	Allowable Emissions (10^3 tons)	Emission Tolerance (10^3 tons)
Four Corner[a] (014)	85	.151	.128		65	37.7	48.3	10.6
Utah Portion NDA		1.8			60	1.7	1.3	0
Utah NDA (219)		20.0			--	19.2	18.9	0
Wasatch Front (220)	79	33.8	30.1	-	54	57.9	26.8	0

a. Interstate

b. Data not presented in SIP

Table A-11. Utah Required Emission Reductions, SO_2

	SIP				1973 DATA			
AQCR	AQ Measurement Control Value	Emissions (10^3 Tons)	Allowable Emissions (10^3 Tons)	1975 Estimated Emissions After Controls[b] (10^3 Tons)	Percent Reduction Required Based On 1973 AQ Data	NEDS Emissions (10^3 Tons)	Allowable Emissions (10^3 Tons)	Emission Tolerance (10^3 Tons)
Four Corners[a] (014)	-	-	-	-	91	119.4	108	0
Utah Portion	-	2.0	-	-	Meets Standards	1.7	NDA	-
Utah (219)	-	8.8	-	-	Meets Standards	11.6	NDA	-
Wasatch Front (220)	2930[c]	345.4	190	NC	88	154.5	18.4	0
SLC Area Meets Standards	-	-	-	-	SLC Area Meets Standards	-	-	311.5

a. Interstate

b. Data not presented in SIP

Table A- 12. Fuel Combustion Regulations - Utah

	Existing Sources	New Sources
SO_2	Coal - 1.0% Sulphur by Weight Oil - 1.5% Sulphur by Weight (Section 3.3.1. of Utah Code)	80% Control of input Sulphur from facilities with potential emissions of 500 tons of SO_2 per year or greater (Section 3.6.1. of Utah Code)
Particulate	#2 Ringelmann (40% capacity) (Section 3.2.1.)	#1 Ringelman (20% capacity) (Section 2.2.2.)
	85% control of potential particulate emissions (Section 3.5.1. of Utah Code)	
	Fuel Burning Sources - Wasatch Front Range 10 or less ..... 0.6 lb/10^6 Btu 10 MBtu to 10,000 MBtu...$A=0.87C^{-0.16}$ Where A = allowable emission rate in lb/10^6 Btu C = total rated capacity in 10^6 Btu/hr	

APPENDIX B

Tables B-1 and B-2 are the assessment of AQCR's which should be examined for the fuel switching impact on particulate and SO_2 emissions. They also provide an identification of those AQCR's which show little potential for fuel revision or regulation relaxation if ambient air standards are to be attained.

The criteria for candidates are:(1) the severity and breadth of air quality violations, (2) the tolerance for emissions increased in the AQCR, (3) the fraction of total emissions resulting from fuel combustion, and (4) AQMA designations. It should be noted that an AQCR may not necessarily need relaxation of regulations in order to accomplish fuel switching. Further, a good candidate in Tables B-1 and B-2 may later show little potential for fuel switching after individual sources are examined. Finally,it is possible that an AQCR may have air quality levels below standard at present and may require more strict regulations than currently exist if all fuel burning sources were converted to dirtier fuels, i.e., "average" emission rate now may be below "average" regulations.

B-1. Candidacy Assessment for Relaxation of TSP Regulations

AQCR	Air Quality # Monitors	Air Quality # Violations	Expected Attainment Date	Total Emissions (10^3 tons)	Any Proposed AQMA Designations?	% Emission from Fuel Combustion	Tolerance for Emissions Increase (10^3 tons)	Overall Regional Evaluation
014	23	8	7/75	37.6	-	79.2	10.6	Marginal
Utah Portion	2	2	7/75	1.7	5	44.1	0	Poor
219	0	-	a	19.1	3	48	0	Poor
220	6	6	7/77	57.9	3	43.6	0	Poor

B-2. Candidacy Assessment for Relaxation of SO_2 Regulations

AQCR	Air Quality # Monitors	Air Quality # Violations	Expected Attainment Date	Total Emissions (10^3 tons)	Any Proposed AQMA Designations?	% Emission from Fuel Combustion	Tolerance for Emissions Increase (10^3 tons)	Overall Regional Evaluation
014	13	1	3/76	119.8	-	93.8	0	Poor
Utah Portion	0	-	a	1.7	5	49.6	-	--
219	0	-	a	11.6	3	62.3	-	--
220	12	8	7/77	154.5	2	16.1	0	Poor
Salt Lake City Area							311.5	Good
Neglating violations relating to smelter source								

a) Air Quality Levels Presently Below Standards

APPENDIX C

This section is a review of individual power plants by AQCR. The intent is to illustrate: (1) current SO_2 and particulate emissions, (2) fuel switching possibilities, and (3) allowed emissions for power plants based on current regulations. The total AQCR emissions resulting from possible fuel switches is then calculated.

Current power plant information used to prepare Table C-1 were obtained from three main sources: (1) Federal Power Commission computerized listings of power plants and their associated fuel use, (2) the National Coal Association "Steam Tables" listing of power plants and fuel use in 1972, and (3) NEDS Emissions data.[1] For those plants listed by the FPS (1 above), the 1973 fuel schedule was assumed, otherwise, fuel use is for 1972. Heat inputs are those based on actual fuel values where known, and average values shown in Table C-5 were used where not known. SO_2 and particulates emissions are those associated with the fuel use shown. In the case of particulates, emissions were calculated using NEDS emissions factors applied to the listed fuel schedule (in both tonnage and $lbs/10^6$ Btu). When a plant was not listed in NEDS, AP 42 emission factors were used to estimate SO_2 and particulate emissions (see Table C-5).

Table(s) C-1 also lists allowable emissions calculated by applying current regulations to the given plant, taken from Table A-12. (Particulate limits are assumed to be based on the entire heat input of the plant. Actual rules may be different when applied to each of several boilers in a power plant or applied on the basis of design capacity rather than actual amount of fuel used.)

It might be cautioned that AQCR total emissions calculated in the tables of Appendix C (and also Appendix D) may not agree exactly with total emissions represented in Appendix A (Tables A-7, A-8). This is a result of both differing fuel schedules in 1973 compared to previous years and the relative "completeness" of the NEDS data bank. Along the same line, AQCR totals may contain a "mix" of 1972 and 1973 fuel schedules (and resulting emissions). The intent of the listings is not great precision, but rather to show approximate status relative to regulations at present.

Table C-2 lists power plants under construction or consideration for the near to medium term future. No evaluation of these plants is attempted here since Federal new source performance standards would apply. It is not the

purpose of this report to evaluate such standards. Inclusion of new plants is for background information which might have a bearing on other decisions about emission regulations in an AQCR.

Table C-4 lists the present fuel sources for each of the power plants. The power plants that utilize both coal and other fuels are candidates for fuel switching. These plants are further evaluated in Appendix F.

Table C-1A. Utah Power Plant Evaluation[a]

AQCR/ County	Utility Name	Plant Name	MW	Fuel			Emissions ~ Tons/Yr					
				Type	Amount 10^3 Tons/Yr	Heat Input 10^6 Btu/H	SO_2 Exis.	SO_2 Allow.	TSP Exis.	TSP Allow.	NO_2 Exis.	NO_2 Allow
14 Iron	Cal Pacific Utility	Cedar City	7.5	Coal 0.5% S 8.3% A	10.3	100	98	197	73	108	93	-
219 Carbon	Utah Power & Light	Carbon #1	75	Coal 0.5% S 6.9% A	161	773	1530	3060	75	1420	1450	-
		Carbon #2	114	Coal 0.5% S 6.9% A	226	1025	2150	4300	2650	2000	2030	-
220 Davis		Bountiful City Power (Diesel)	?	Oil 0.6% S 0% A	146,000 gallons	Diesel	2	15	<1	9	27	-
				Nat'l Gas	134 x 16^6 Cu Ft	Diesel	-	15	-	9	-	-
220 Davis		Clearfield Steam Co. (2 boilers-1 stack)	?	Coal 0.7% S 10% A	6.4	25	86	123	24	58	49	-
				Coal 0.7% S 10% A	6.4	25	86	123	24	58	49	-

[a]Taken from NEDS, August 1974; and Steam Electric Plant Factors, 1973 Edition, NCA, January 1974

Table C-1B. Utah Power Plant Evaluation[a]

AQCR/ County	Utility Name	Plant Name	MW	Fuel			Emissions - Tons/Year					
				TYPE	Amount 10^3 Tons/Yr	Heat Input 10^6 Btu/H	SO_2 Exis.	SO_2 Allow.	TSP Exis.	TSP Allow	NO_2 Exis.	NO_2 Allow
220 Salt Lake	UP&L	Jordan	25	Nat'l Gas	272 No^6CuFt	76	<1	80	2	144	82	-
				Oil 0.5% S 0% A	663x10^3 gallons	76	24	80	3	144	35	-
200 Salt Lake	UP&L	Gatsby #1	69	Nat'l Gas	628x10^6CuFt	674	<1	2670	5	903	188	-
				Oil 1.25% S 0% A	22.6x10^6 gallons	674	2210	2670	90	903	1180	-
	UP&L	Gatsby #2	69	Nat'l Gas	352x10^6CuFt	717	<1	3190	<1	950	106	-
				Oil 1.26% S 0% A	22.6x10^6 gallons	717	2240	3190	<1	950	1190	
				Coal 0.5% A 6.9% S	27.3	717	260	3190	<6	950	246	
	UP&L	Gatsby #3	114	Nat'l Gas	1890x10^6CuFt	1072	<1	4150	<1	1330	568	-
				Oil 1.26% S 0% A	7.2x10^6 gallons	1072	713	4150	<1	1330	378	-
				Coal 0.5% S 6.9% A	173	1072	1650	4150	305	1330	1560	-

[a]Taken from NEDS, August 1974; and Steam Electric Plant Factors, 1973 Edition, NCA, January 1974

Table C-1C. Utah Power Plant Evaluation[a]

AQCR/County	Utility Name	Plant Name	Fuel				Emissions - Tons/Yr					
			MW	Type	Amount 10^3 Tons/Yr	Heat Innut 10^6 Btu/H	SO_2 Exis.	SO_2 Allow.	TSP Exis.	TSP Allow.	NO_2 Exis.	NO_2 Allow
220 Salt Lake	City Power #1	Murray		Oil 0.5% S 0% A	$67.1x10^4$ gallons	142	<1	6	<1	29	4	-
				Nat'l Gas	$96x10^6$CuFt	142	-	6	-	29	29	-
	#2			Oil 0.5% S 0%A	$67.1x10^4$ gallons	142	<1	6	<1	29	4	-
				Nat'l Gas	$96x10^6$CuFt	142	-	6	-	29	29	-
	#3			Oil 0.5% S 0% A	$67.1x10^4$ gallons	142	<1	6	<1	29	4	-
				Nat'l Gas	$96x10^6$CuFt	142	-	6	-	29	29	-
	#4			Oil 0.5% S 0% A	$67.1x10^4$ gallons	142	<1	6	<1	29	4	-
				Nat'l Gas	$96x10^6$CuFt	142	-	6	-	29	29	-
	#5			Oil 0.5% S 0% A	$67x10^4$ gallons	142	<1	6	<1	29	4	-
				Nat'l Gas	$96x10^6$CuFt	142	-	6	-	29	29	-
220 Utah	City Power	Provo	14	Nat'l Gas	$195x10^6$	875	4	253	<1	177	22	-
				Coal 0.7% S 10% A	$13.3x10^3$	24	177	253	33	177	100	-
220 Utah	Utah	Utah Power & Light	44	Coal 0.5% S 6.9% A	$18x10^3$	24	171	342	42	804	162	-
				Nat'l Gas	$597x10^3$CuFt	930	<1	342	<1	804	179	-

[a]Taken from NEDS, August 1974; and Steam Electric Plant Factors, 1973 Edition, NCA, January 1974

Table C-2. Power Plant Projected Development 1974--1985[b,c] AQCR 14

County	Owner	Plant	Capacity	Estimated Emissions Tons/Year NSPS Particulate	NSPS SO_2	Utah[a] SO_2
Emery	UP&L	Huntington	845	3955	47479	8234
		North Emery	830	3955	47479	8234
Wayne	IPCA	Factory Butte	?	--	--	--
	IPCA	Caineville	3000	13797	165564	28777
Garfield	UP&L	Escalante	2000	9198	110376	19184
	IPCA	Escalante	?	--	--	--
Kane	APS,SPP, SCE,SDG &E	Kaiparowits	3000	13797	165564	28777
Washington	NP,UP&L	St. George	2500	11498	137970	24002

(a) Based on 80% reduction of SO_2 over uncontrolled

(b) All plants are coal fired mine month plants

(c) Based on EPA Technical Supoort for Designation of AQMA's

Table C-3. Estimated Air Quality Impacts for Proposed Power Plants in AQCR 14[a,b]

Plant	SO_2 24-Hr.	SO_2 3-Hr.	Particulate 24-Hr
Huntington Canyon	515	1285	27
North Emery	4	120	1
Factory Butte	-	-	-
Caineville	16	440	2
Escalante #1	11	300	1
Escalante #2	-	-	-
Kaiparowits	770	2500	17
St. George	13	370	2

a. Assumes compliance with EPS NSPS, does not account for Utah 80% SO_2 regulation.

b. Based on EPA modeling results performed on part of the AQMA designation study.

Table C-4. Present Utah Power Plant Fuel Sources

AQCR	Power Plant	Utility
COAL ONLY		
14	Cedar City Plant	CPU
219	Carbon #1 & #2	UP&L
220	Freeport Center	Clearfield Steam Co.
GAS & OIL ONLY		
220	Bountiful	Bountiful City Power
	Gatsby #1	UP&L
	Jordan	UP&L
	Murray #1,2,3,4,&5	Murrary City Power
Coal & Other Fuel		
220	Gatsby #2 & #3	UP&L
	Provo	Provo City Power
	Hale	UP&L

Table C-5. AP-42 Power Generation Emission Factors

Fuel	Particulates		SO_2		Hydrocarbons		NO_x (as NO_2)	
	Lbs/Ton	Lbs/10^6 Btu	Lbs/Ton	Lbs/10^6 Btu	Lbs/Ton	Lbs/10^6 Btu	Lbs/Ton	Lbs/10^6 Btu
Coal[1] (Bit.)								
General	160	7.4			0.3	0.013	18	0.78
Wetbottom 10% A	130	7.0					30	1.3
Cyclone	20	0.9					55	2.4
1% S	Same	Same	38	1.65	0.3	0.13	Same	Same
2% S	as	as	76	3.3			as	as
3% S	Above	Above	114	5.0			Above	Above
Oil[2]	Lb/10^3 Gal		Lb/10^3 Gal		Lb/10^3 Gal		Lb/10^3 Gal	
0.5% S	8	0.058	79	0.56	2	.014	105	0.75
1.0% S	8	.058	157	1.12	2	.014	105	0.75
2.0% S	8	.058	314	2.24	2	.014	105	0.75
Gas[3]	Lb/10^6Ft^3		Lb/10^6Ft^3		Lb/10^6Ft^3		Lb/10^6Ft^3	
(.3 lbs S/ 10^6 Ft^3)	15	.015	0.57	.00057	1	.001	600	0.60

(1) Coal 23 x 10^6 Btu/Ton
(2) Oil 140 x 10^3 Btu/Gal
(3) Gas 1000 Btu/Ft^3

APPENDIX D

MAJOR INDUSTRIAL SOURCES that are CANDIDATES for FUEL SWITCHING

All major stationary fuel combustion sources were reviewed to identity candidates for fuel switching. There are no major fuel combustion sources in the Utah and Four Corners AQCR's that do not presently use coal or that have apparent capability to switch to coal. Table D-1 lists the major sources in the Wasatch Front AQCR that presently use coal for at least part of the time and are candidates for 100% conversion. These plants are further analyzed in Appendix F.

Table D-1. Major Industrial Fuel Combustion Sources with Coal and Other Fuel Capability

AQCR	Kennecott	Boiler Capacity 10^6 BTU/Hr	Fuel Type	Yearly Amount	Emissions Tons/Yr Partic Exist	Partic Allow	SO_2 Exist	SO_2 Allow	
220 S. L. County	Source #1	480	Nat'l Gas	$2.3x10^9$CuFt	15	679	<1	570	
			Coal .86% S 8% A	$30,x10^3$Tons/Yr	1430	679	489	570	25% Partic Control
	#2	480	Nat'l Gas	$2.57x10^9$CuFt	16	679	<1	495	
			Coal .86% S 8% A	$2.6x10^3$Tons	1230	679	424	495	25% Partic Control
	#3	480	Nat'l Gas	$2.52x10^9$CuFt	16	679	<1	570	
			Coal .86% S 8% A	$29.8x10^3$Tons	1420	679	489	570	25% Partic
	#4	840	Nat'l Gas	$4.03x10^9$CuFt	3	1090	1	1020	
			Coal .86% S 8% A	$53.3x10^3$Tons	40	1090	879	1020	90% Partic

Table D-1. Major Industrial Fuel Combustion Sources with Coal and Other Fuel Capability (Continued)

AQCR	U. S. Steel	Boiler Capacity 10^6 BTU/Hr	Fuel Type	Yearly Amount	Emissions Tons/Yr Partic Exist	Partic Allow	SO_2 Exist	SO_2 Allow
220 Utah Co.	Source #22	200	Process Gas	$400x10^6$CuFt	3	334	-	-
			Nat'l Gas	$400x10^6$CuFt	4	334	.1	-
			Coal .7% S 6.5% A	$4.9x10^3$Tons	271	334	65	-
	#23	412	Process Gas	$800x10^6$CuFt	6	597	-	-
			Nat'l Gas	$800x10^6$CuFt	7	597	.1	-
			Coal .7% S 6.5% A	$9.75x10^3$Tons	539	597	130	-
	#24	412	Process Gas	$800x10^6$CuFt	6	597	-	-
			Nat'l Gas	$800x10^6$CuFt	7	597	.1	-
			Coal .7% S 6.5%A	$9.75x10^3$Tons	539	597	130	-
	#25	412	Process Gas	$800x10^6$CuFt	6	597	-	-
			Nat'l Gas	$800x10^6$CuFt	7	597	.1	-
			Coal .7% S 6.5% A	$9.75x10^3$Tons	539	597	130	-

APPENDIX E

Area Source Assessment

There are no area sources which could be evaluated within the context of section IV of ESECA.

APPENDIX F
IMPACT of FUEL SWITCHING

The candidate sources for fuel switching identified in Appendices C and D were evaluated to determine the potential effect on emission and to estimate the potential for relaxation of regulations. The percentage of coal utilized was estimated by translating all fuel usage into total annual heat input and directly proportioning on the basis of the percent of annual heat input contributed by each fuel type.

Table F-1 presents the power plant present and potential emissions based on 100% coal utilization with present control equipment. All power plants will meet current emission regulations as configured. The candidate industrial source present and potential emissions is presented in Table F-2 based on maximum coal utilization with present control equipment. A summary of emissions impacts from fuel switching is presented in Table F-3. Because the industrial sources particulate emissions were so far out of line, emissions resulting from the addition of adequate control equipment were calculated and included.

Table F-1. Emissions Resulting from Fuel Switch to 100% Coal for Power Plants with Dual Fuel Capability

AQCR	Source	Present Emissions[a] (Tons/Yr)		Emissions After Fuel Switch			
				Partic (Tons/Yr)		SO_2	
		Partic	SO_2	Emiss	Allow	Emiss	Allow
220	Gatsby #2[b]	16	2500	106	950	1734	21277
	Gatsby #3[c]	305	2363	515	1330	2788	7013
	Provo[d]	33	177	51	177	272	390
	Hale[e]	42	171	95	804	388	776

(a) Based on total emissions from each fuel operation.

(b) Gatsby #2 uses coal for 15% of yearly total heat at present. Assume coal could replace natural gas and oil for an increase in coal utilization of 667%.

(c) Gatsby #3 uses coal for 59% of yearly total heat at present. Assumes coal could replace natural gas and oil for an increase in coal utilization of 169%.

(d) Provo uses coal for 65% of yearly total heat at present. Assumes coal could replace natural gas for an increase in coal utilization of 154%.

(e) Hale uses coal for 44% of yearly total heat at present. Assumes coal could replace natural gas for an increase in coal utilization of 227%.

Table F-2. Industrial Source Emissions Resulting from Fuel Switching to 100% Coal

	Present Emissions[a]		Emissions After Fuel Switch			
			Partic		SO_2	
	Partic	SO_2	Emiss.	Allow	Emiss.	Allow
U. S. Steel[b]						
Source #22	278	65	1223[e]	334	286	-
Source #23	553	130	2433[e]	597	572	-
Source #24	553	130	2433[e]	597	572	-
Source #25	553	130	2433[e]	597	572	-
Plant Total emissions	1937	455	8522	2125	2002	-
Kennecott[c]						
Source #1	1445	489	5621[d]	679	1902	2217
Source #2	1246	424	4847[d]	679	1649	1925
Source #3	1436	489	5586[d]	679	1902	2217
Source #4	43	879	167	1090	3419	3968
Plant Total Emissions	4170	2281	16221	3127	8873	10327

(a) Based on total EMISSIONS FROM EACH FUEL OPERATION.

(b) U. S. Steel uses coal for 15.7% of total heat, natural gas for 53.5% and process gas for 30.8%. Assumed coal could replace natural gas for an increase in coal utilization of 440%.

(c) KENNECOTT uses coal for 25.7% total heat and natural gas for 74.3%. Assumed coal could replace natural gas for an increase in coal utilization of 389%.

(d) Based on current 25% control efficiency. Ninety-one (91%) control equipment would be required to bring it into compliance.

(e) Based on 0% control efficiency - 70%+ would be required to bring in into compliance.

Table F-3. Impact of Fuel Switching AQCR 220

Particulates	Total Tons/Yr	Emissions % from Fuel Comb.	Elect Generation[c] Tons/Yr	%	Point Source Fuel Combustion Tons/Yr	%	Area Source Fuel Combustion Tons/Yr	%
Present	57891	43.6	588	1.0	7317	12.6	17370	30.0
w/Fuel Switch (a)	76898	57.4	959	1.2	25953	33.7[a]	17370	22.5
w/Fuel Switch (b)	62591	47.9	959	1.5	11646	18.6[b]	17370	27.8
SO_2								
Present	154455	16.1	7630	4.9	8150	5.5	8859	5.7
w/Fuel Switch	162575	20.1	7601	4.7	16189	10	8859	5.4

(a) Emissions based on major point sources CONTINUED WITH PRESENT CONTROLS (DO NOT MEET EPA REGS)

(b) Emissions based on major point sources applying controls adequate to meet emission regs

(c) Electricity generation emissions would meet emission regs with present control equipment